

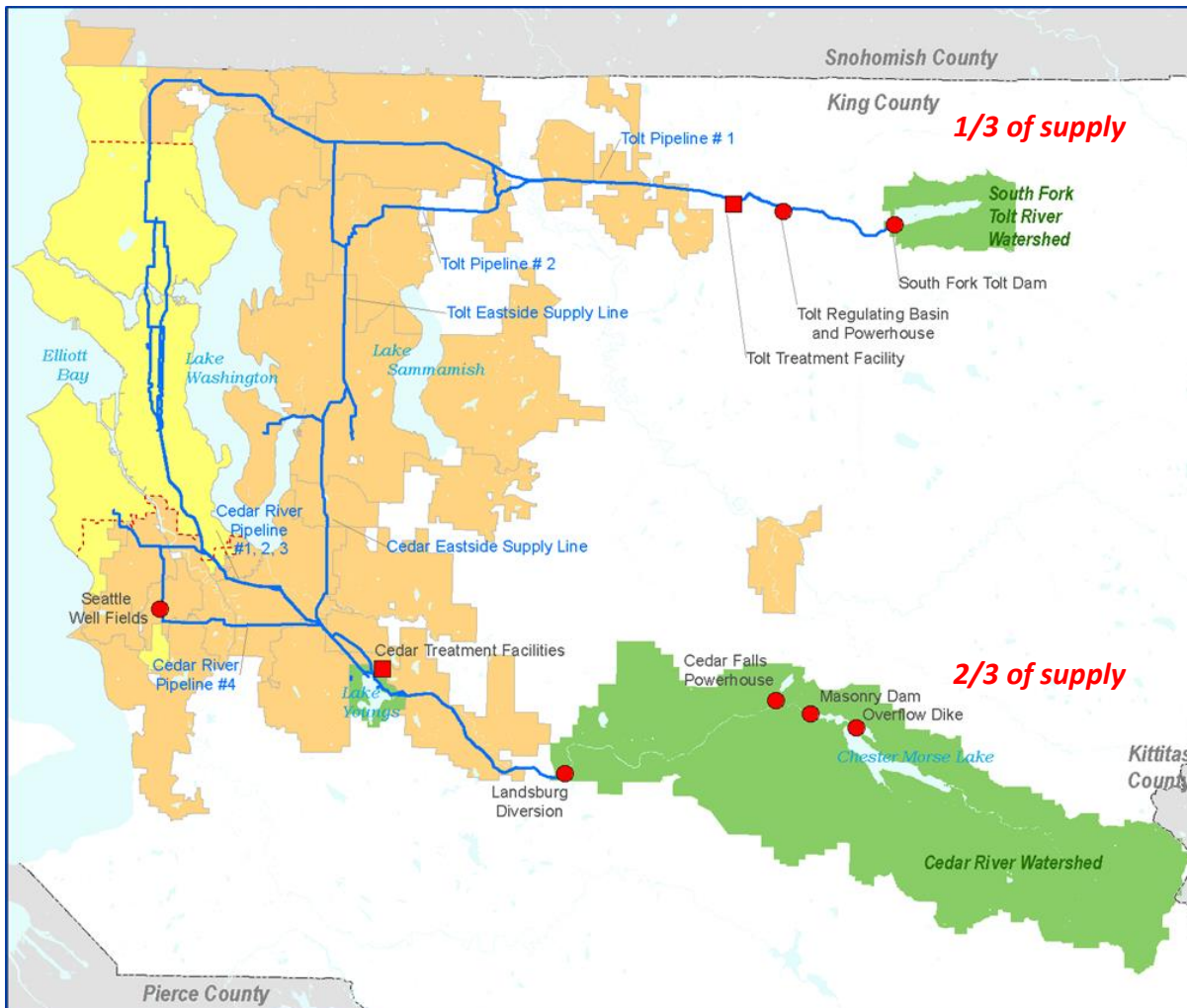
Water Management at Seattle Public Utilities



Outline

- System Overview
- Reservoir Management Seasons and Objectives
- Supply Status Update
- Data & Tools for Multiple Planning Horizons

Seattle's Water Supply System



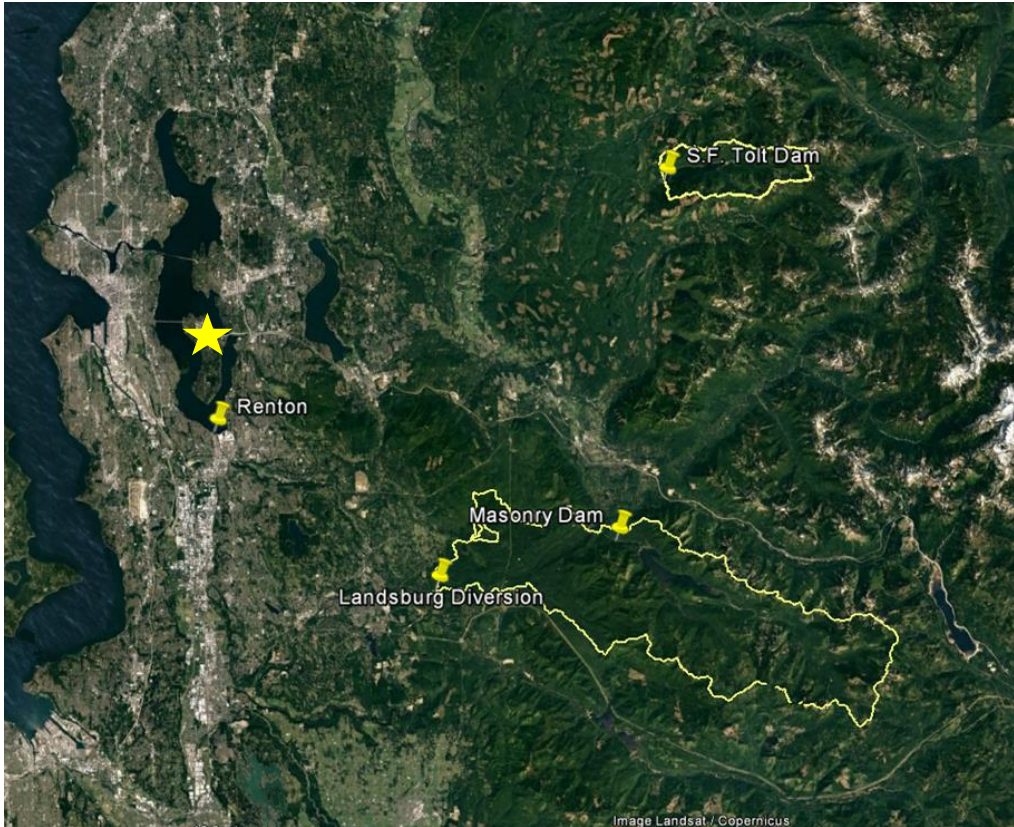
**1.4 million
customers**

**Seattle Retail
Service Area**

**Wholesale
Customers**

**Municipally Owned
Watersheds**

Two Supply Watersheds



South Fork Tolt: 18.8 mi²

Elevation: 1750 ft at reservoir
5500 ft at Cascade Crest

Cedar River

81.4 mi² at Masonry Dam
128 mi² at Landsburg

Elevation: 550 ft at Landsburg
1550 ft at Masonry Dam
5400 ft at Cascade Crest

Managing for Multiple Objectives

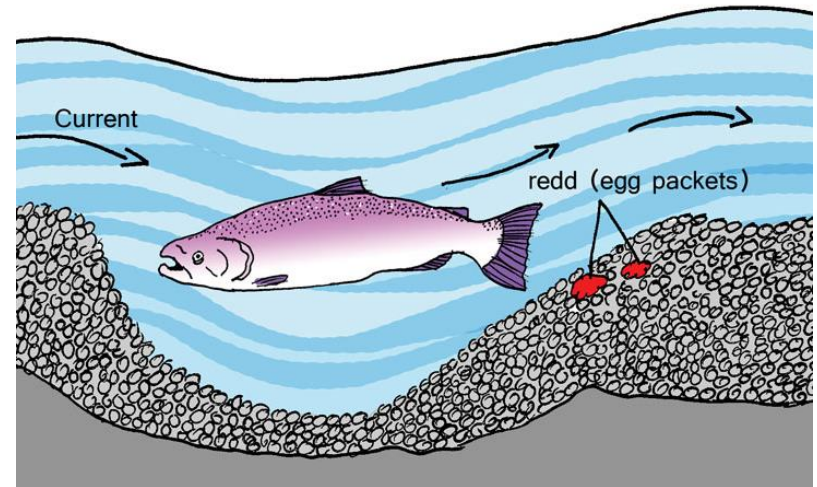
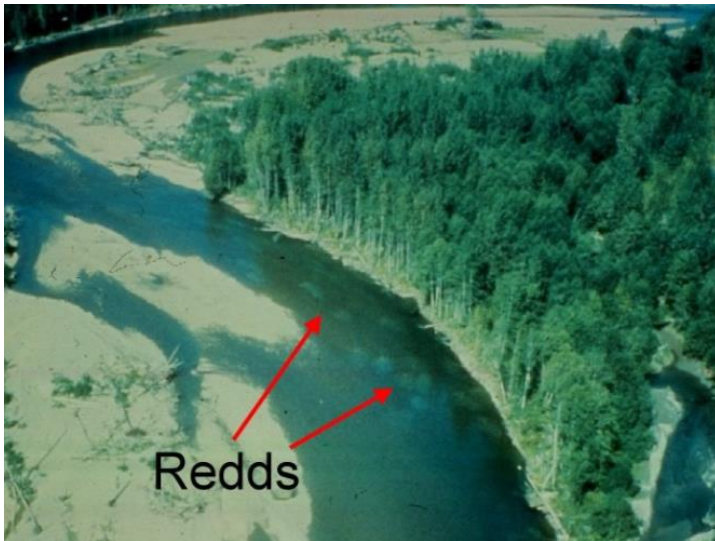
Supply: Reservoir Level/Storage Volume

- Water for people
- Aquatic Resources (i.e., bull trout)
- Flood management
- Hydropower (coordination w/SCL)
- Dam safety, Infrastructure

Managing for Multiple Objectives

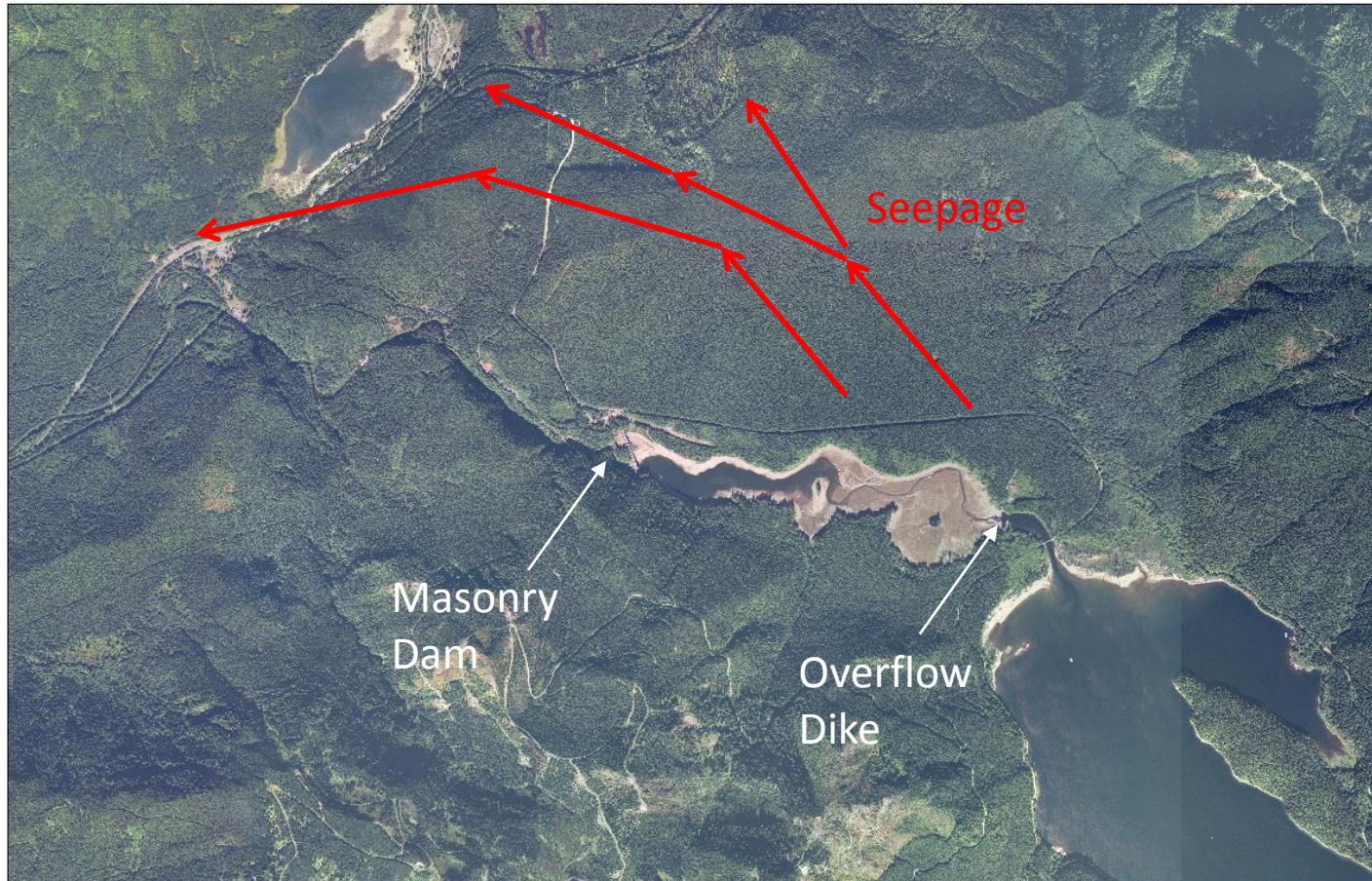
Instream River Flow

- Water for fish – minimum flow requirements, avoid scour of spawning gravels, down ramp slowly to avoid stranding fish
- Minimize Floods
- Coordination w/ USACE for managing Lake Washington



Cedar Moraine Seepage

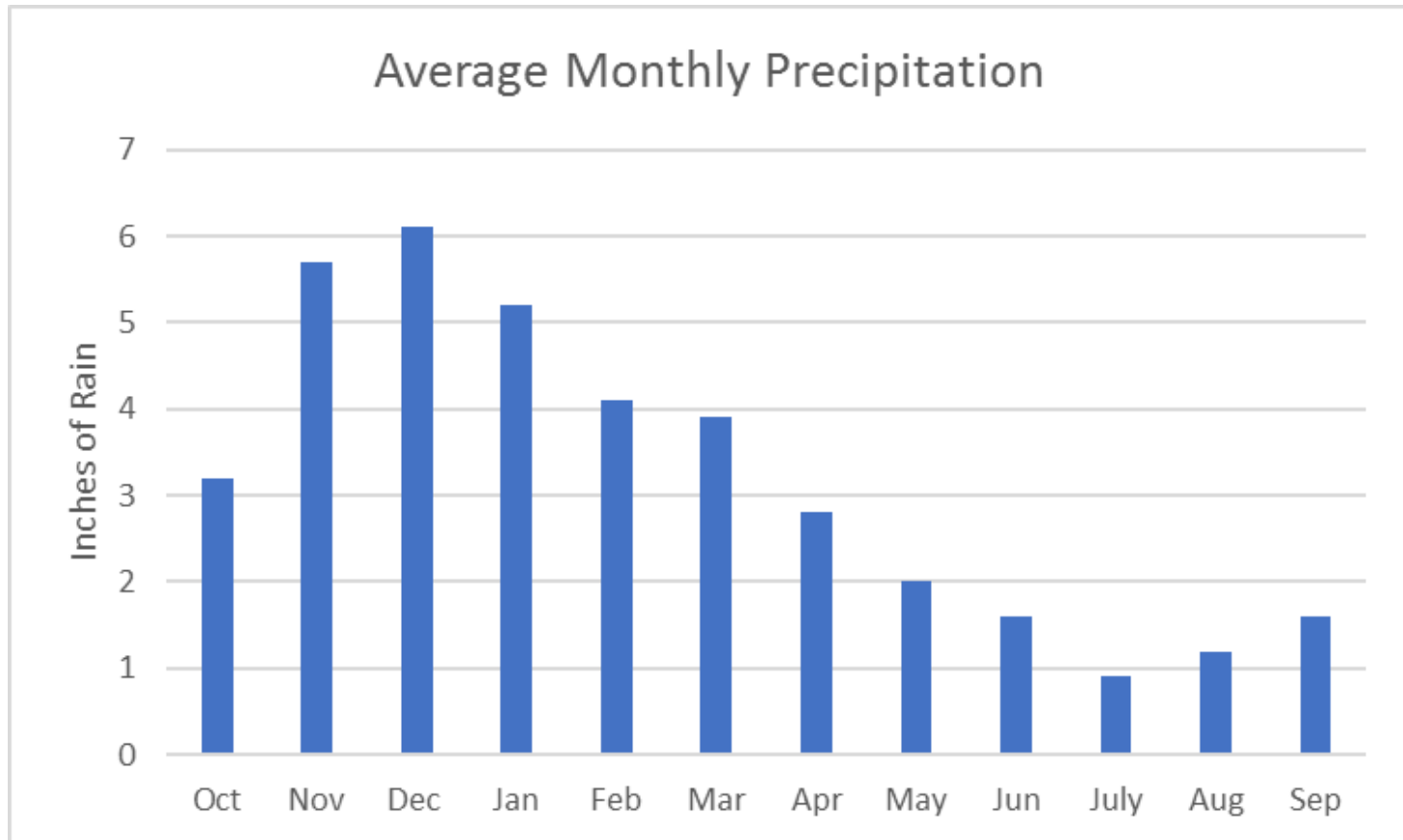
SPU continues to manage for seepage and monitor local springs



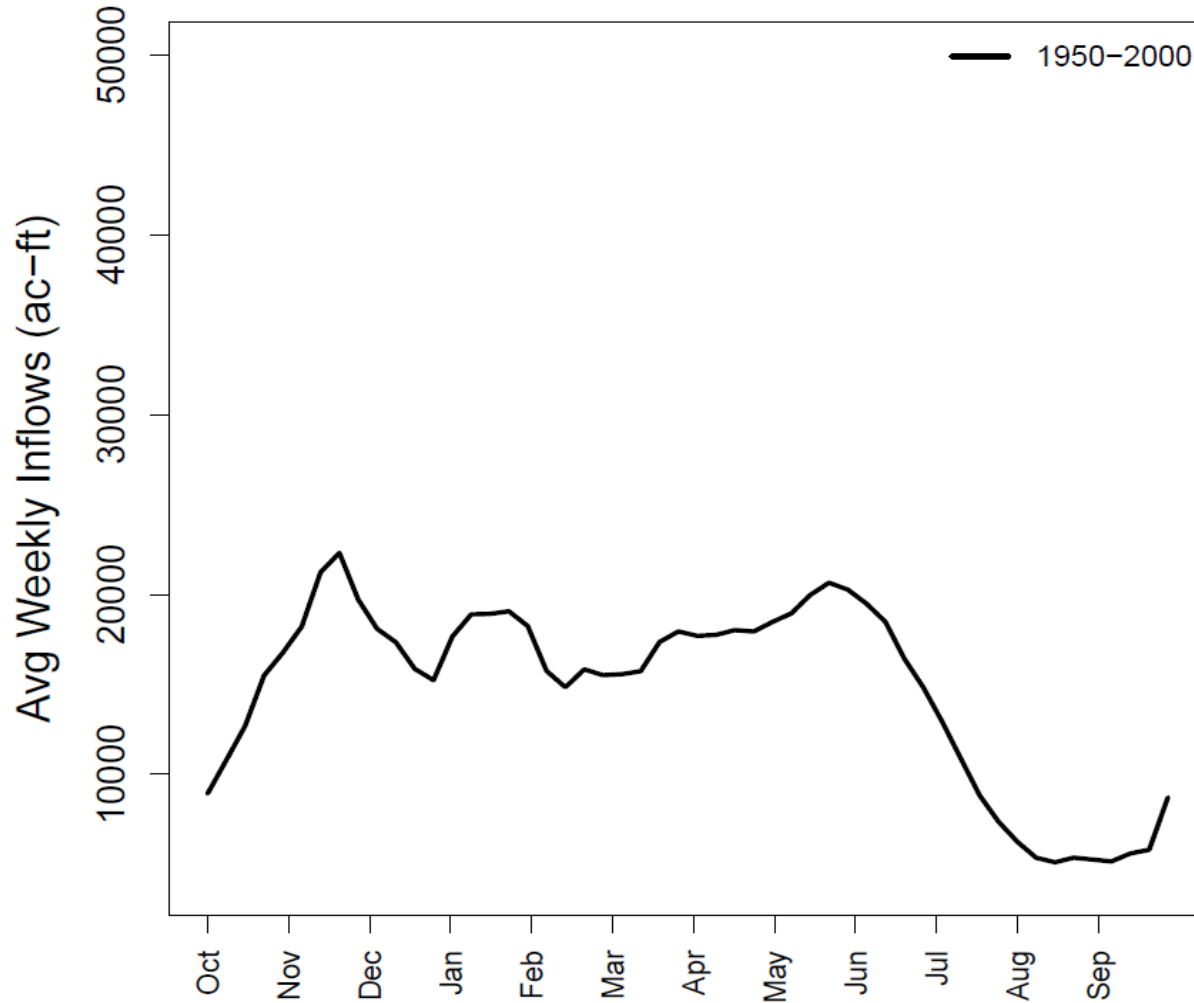
Reservoir Management Seasons



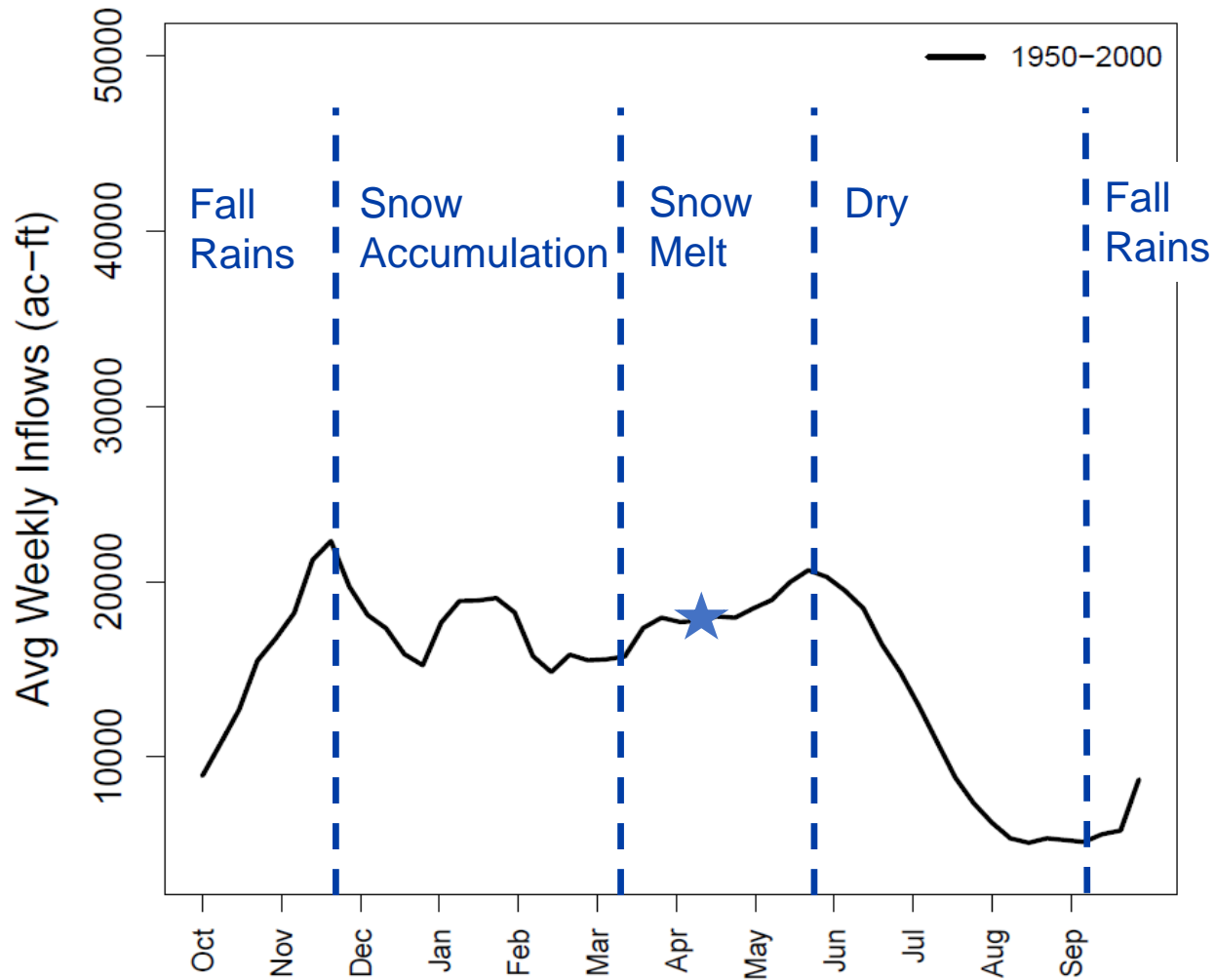
Rain falls mostly in the winter (Municipal demands peak in the summer)



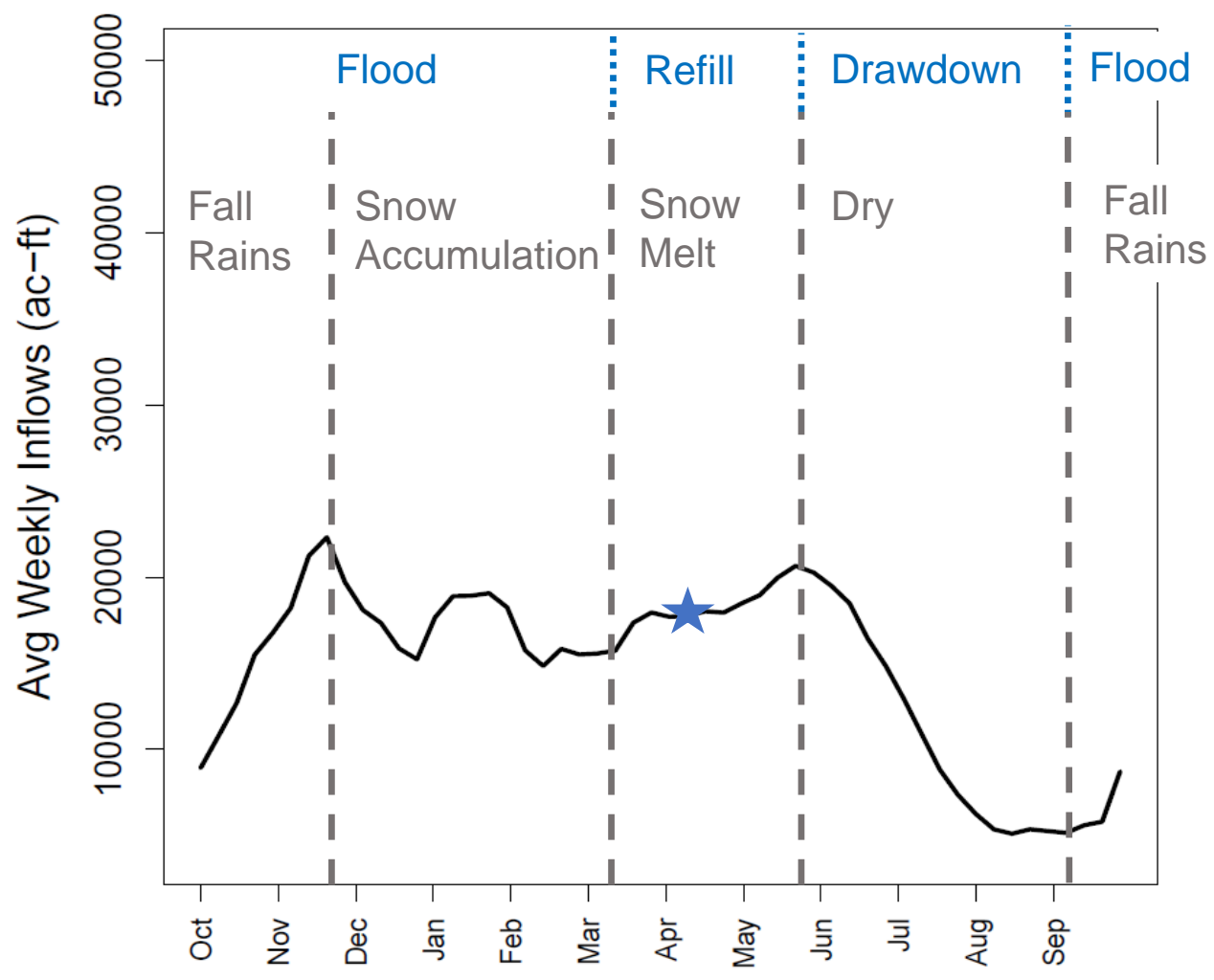
Average Tolt & Cedar Inflows to Reservoirs



Hydrologic Seasons

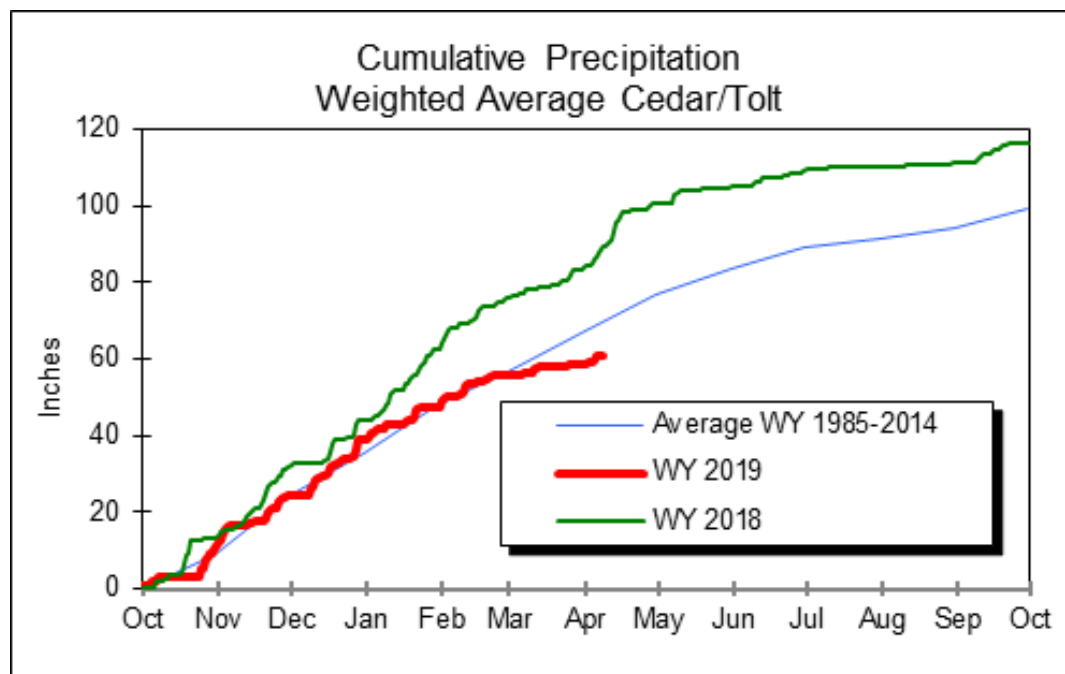


Hydrologic Seasons → Management Seasons



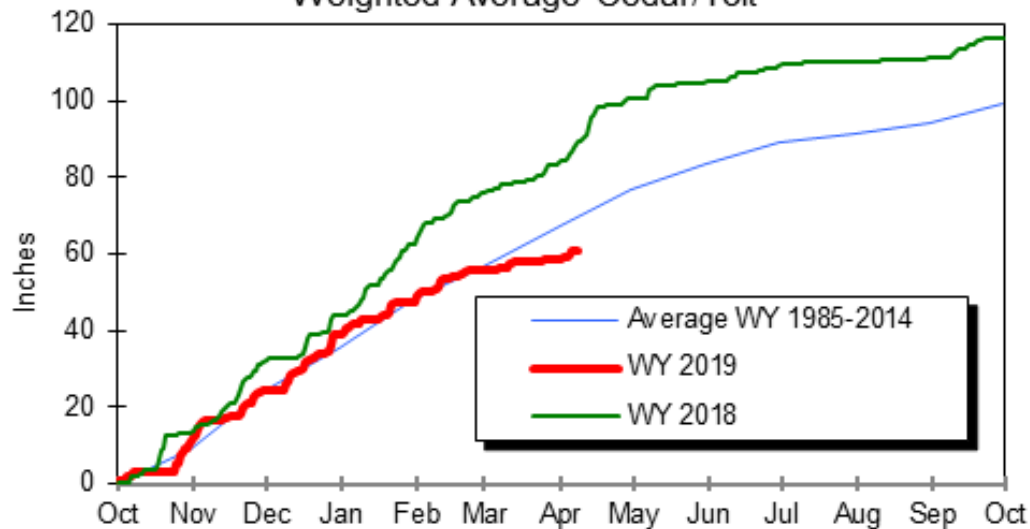
Supply Status Update





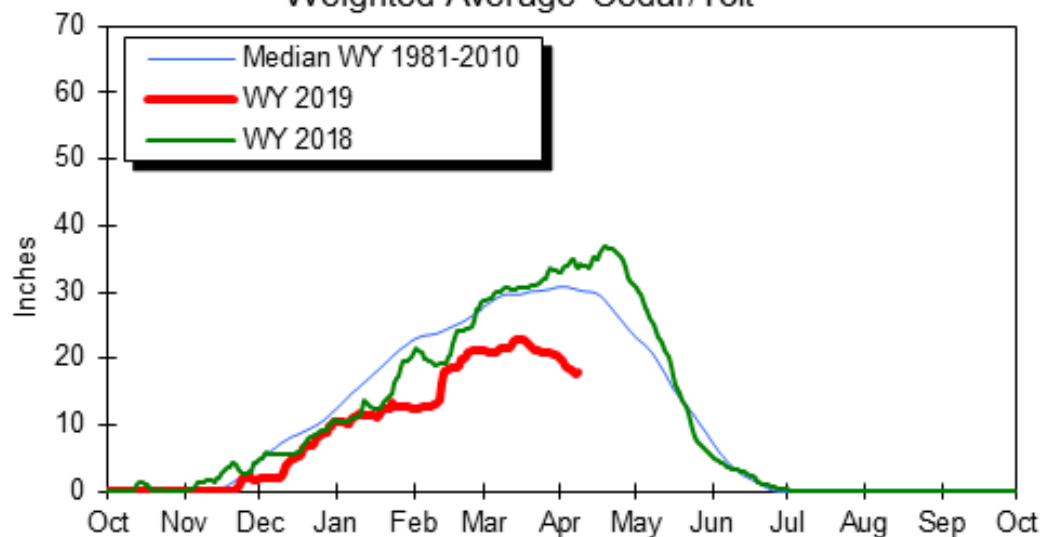
Below average
precipitation last 30 days

Cumulative Precipitation
Weighted Average Cedar/Tolt



Below average
precipitation last 30 days

Snowpack (Snow Water Equivalent)
Weighted Average Cedar/Tolt

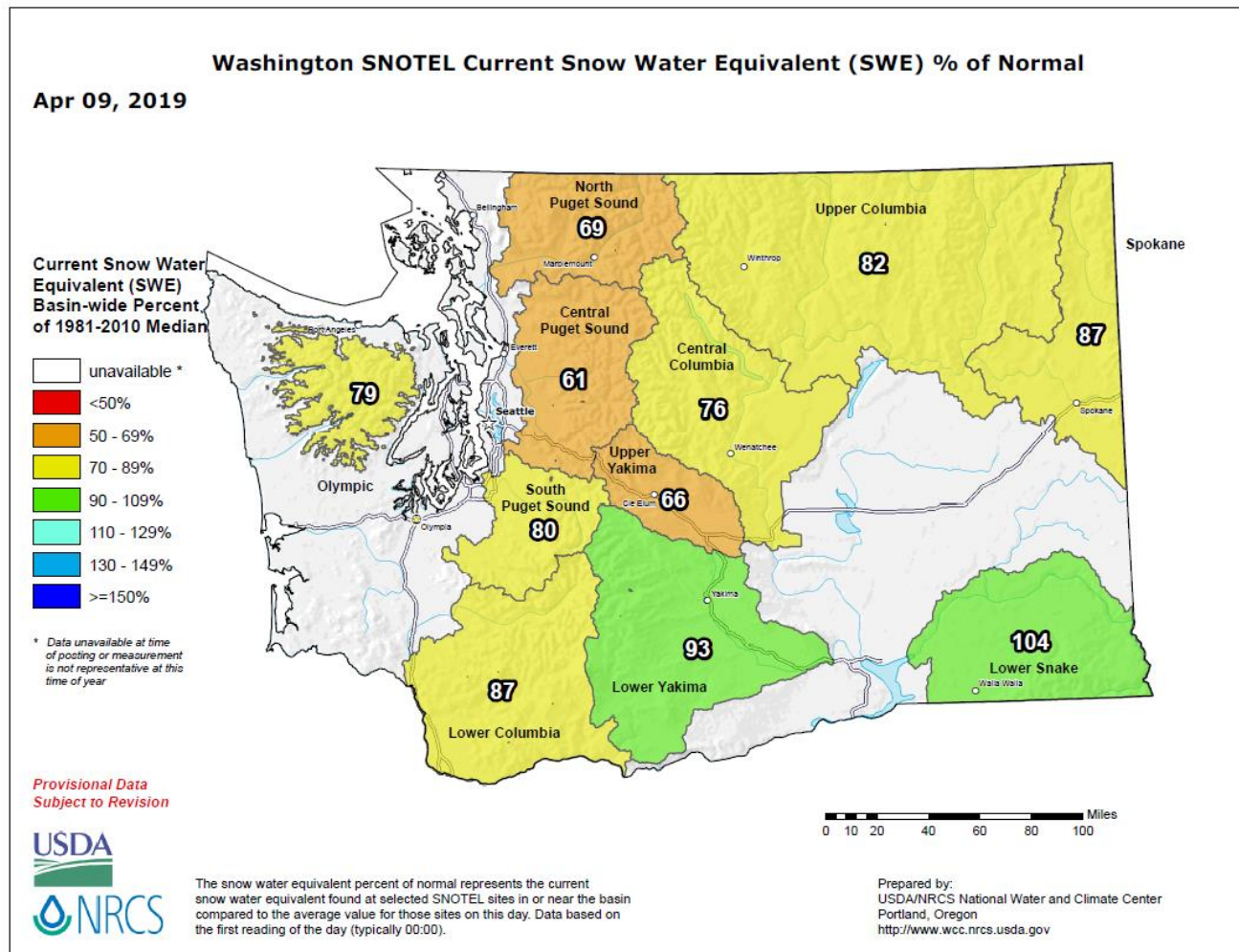


Below Average
Snowpack

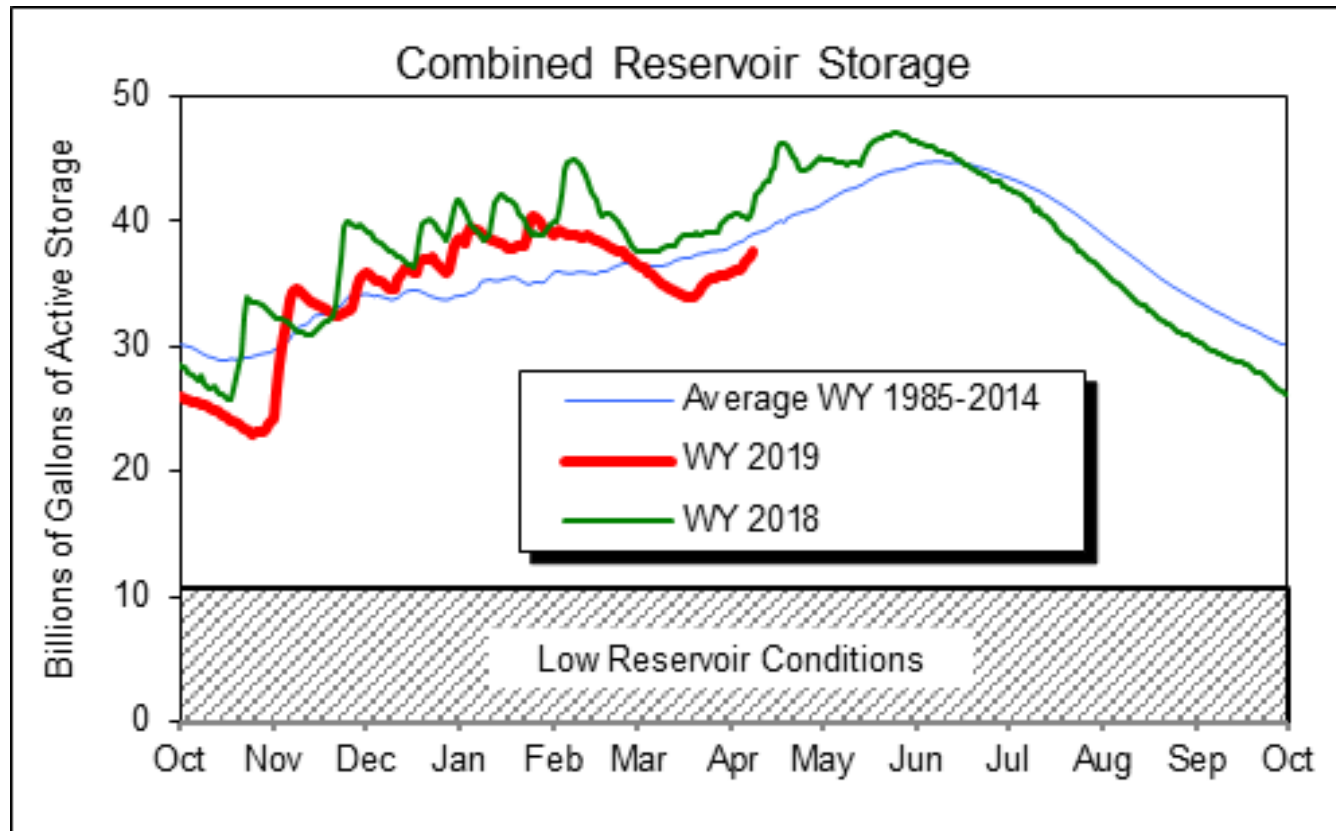


City of Seattle

Snowpack - 61% of regional average

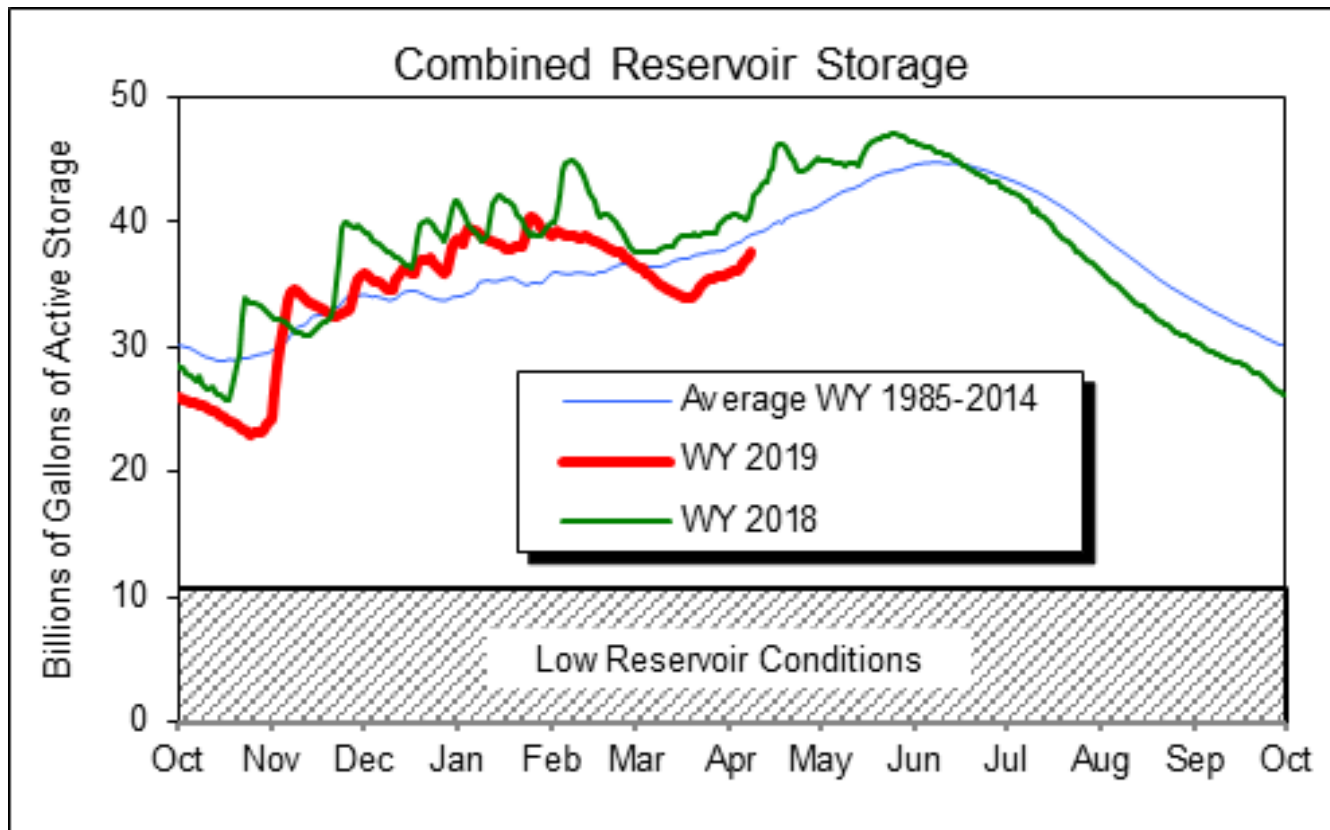


Reservoir refill - snowmelt + rain



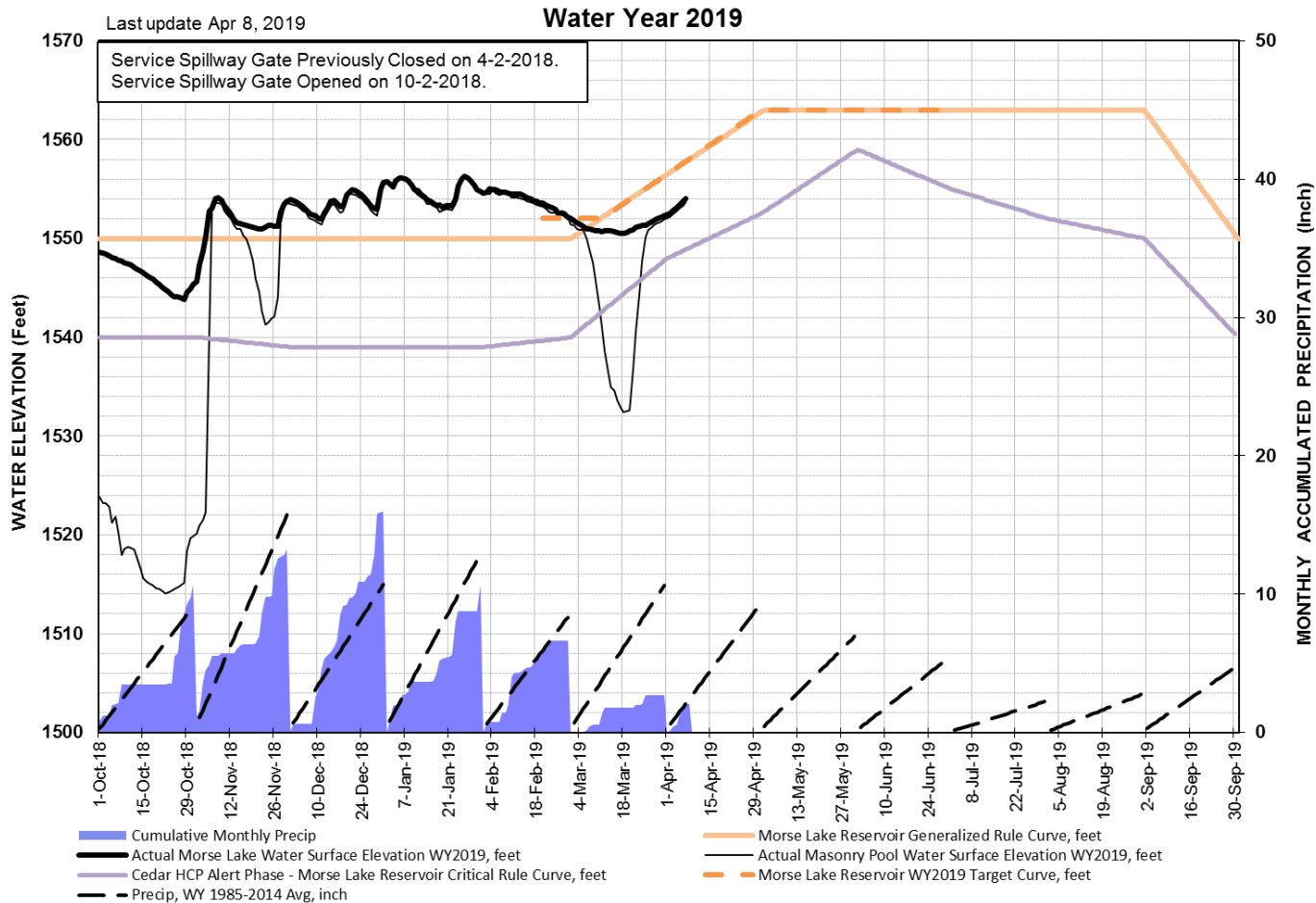
Reservoir refill - snowmelt + rain

Based on current conditions and forecasts, Seattle anticipates it will have sufficient water supply for people and fish this summer.



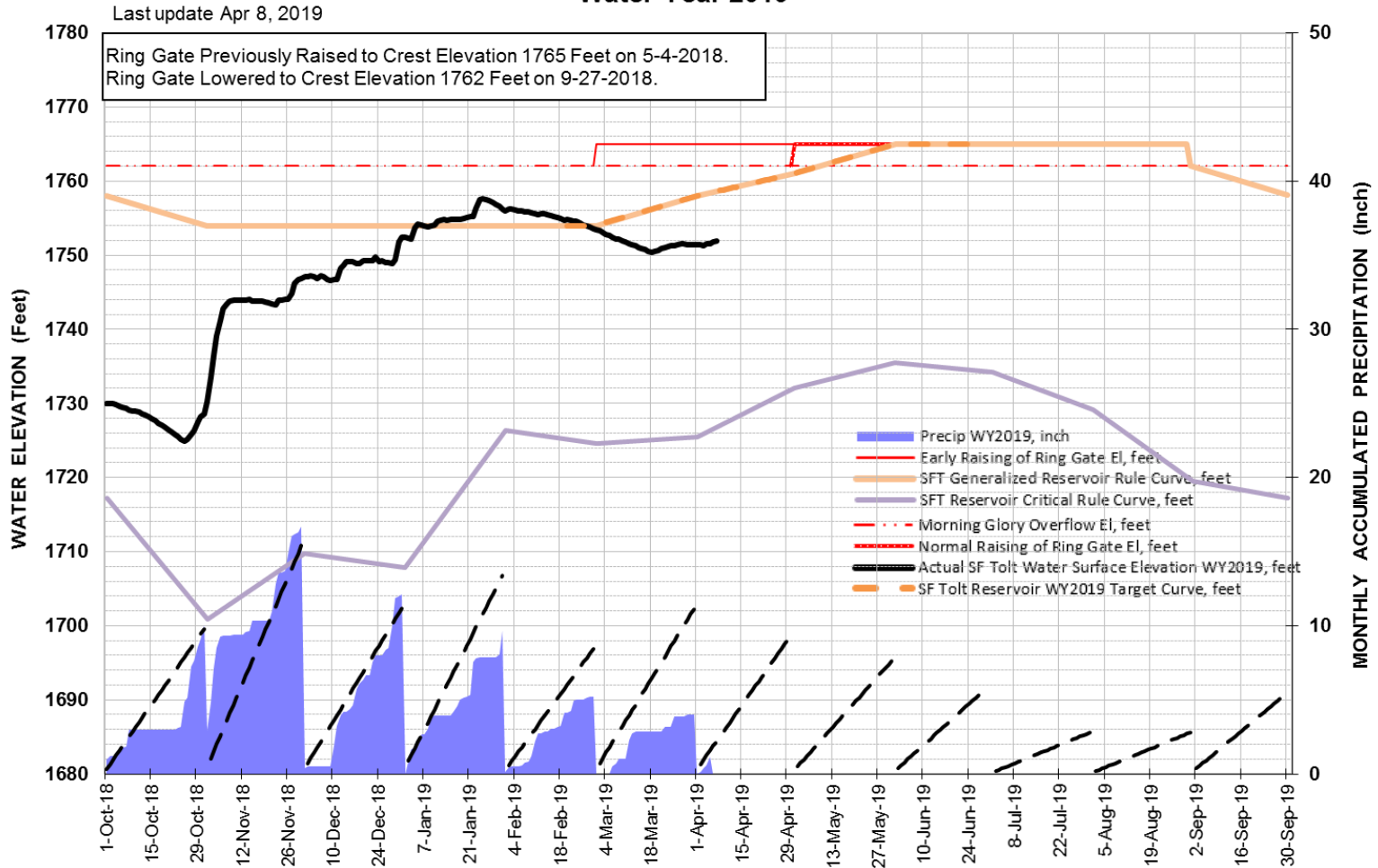
Chester Morse Lake

CEDAR RIVER AT RESERVOIR



South Fork Tolt Reservoir

Water Year 2019



Questions?

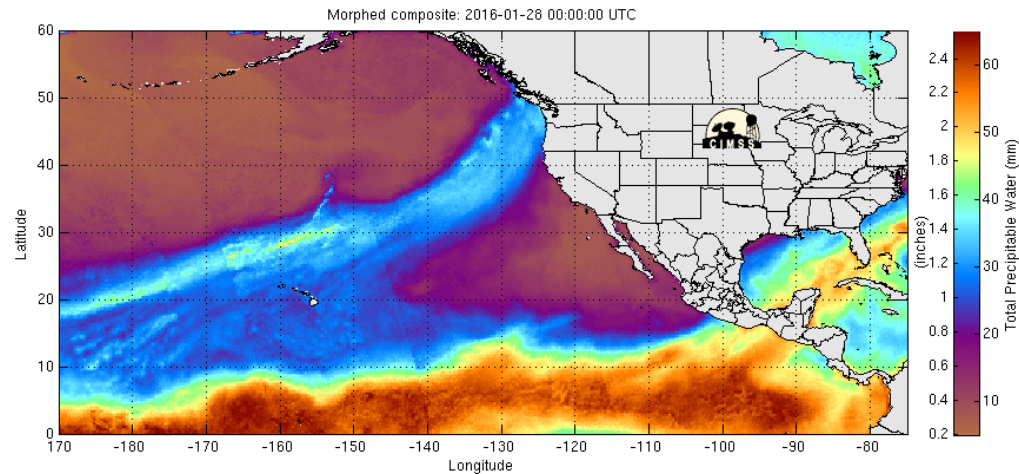


Data & Tools

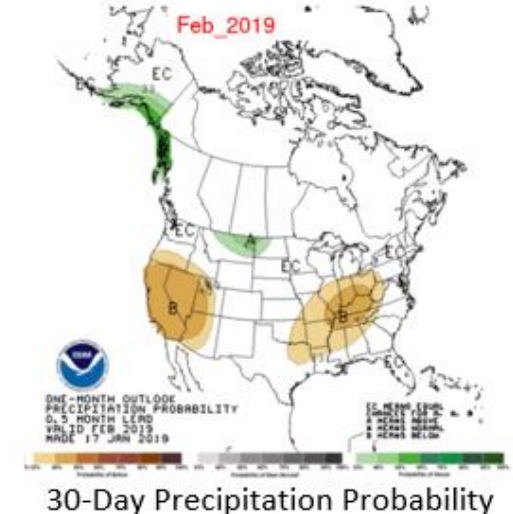
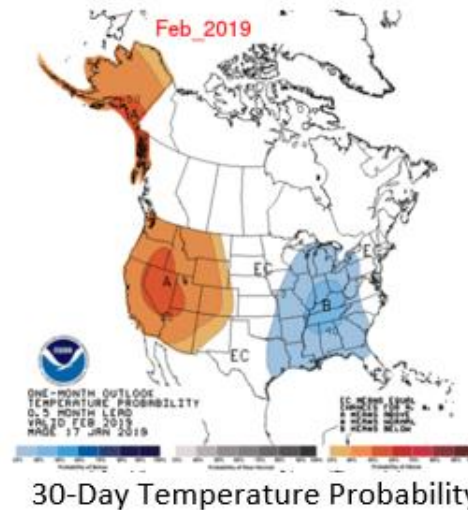


Data & Tools: Planning Horizons

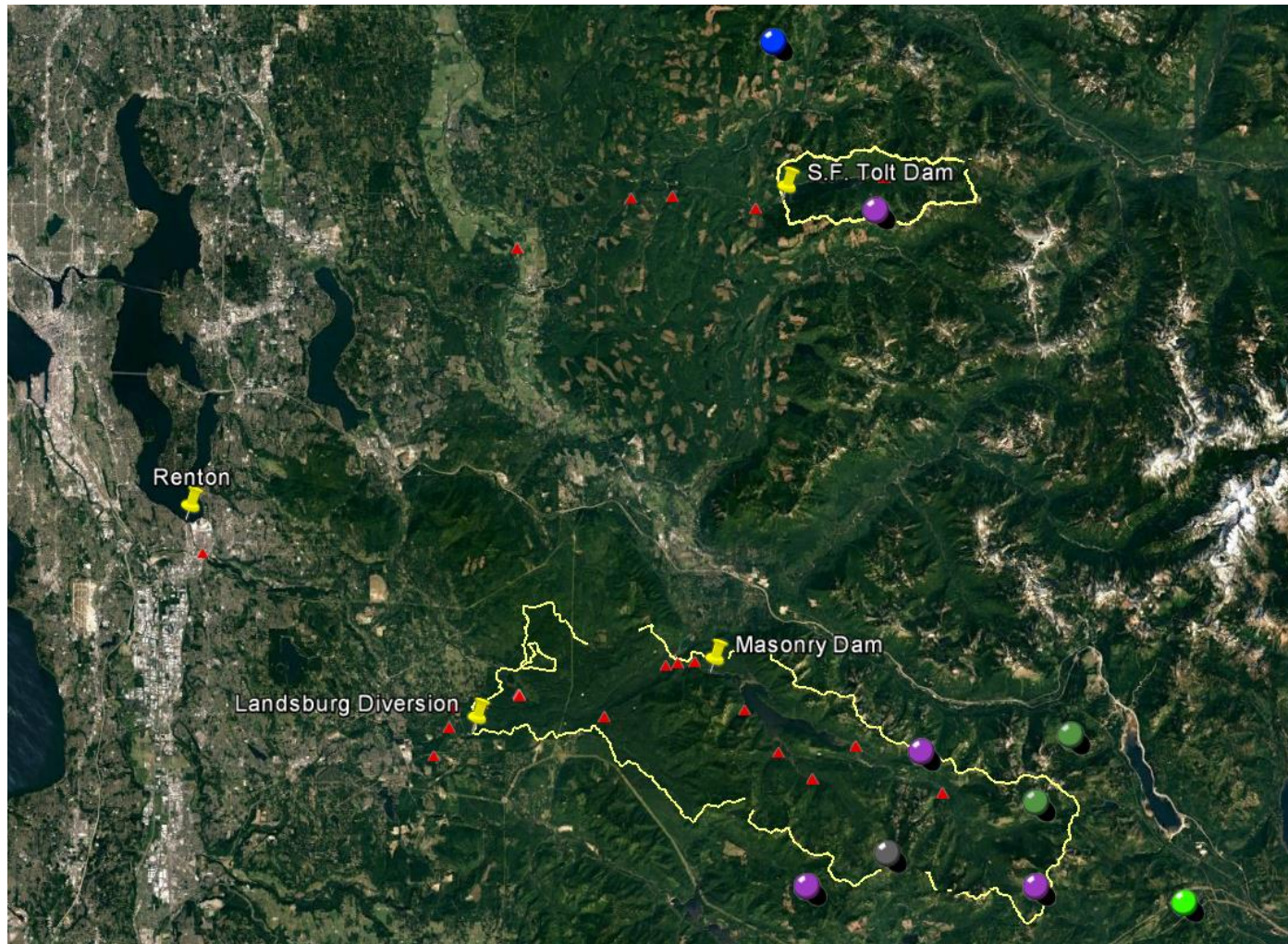
- Real-time (day-of)
- 0-3-10 days
- 2 weeks



- Seasonal
- Long-range
- Climate Change



Hydrologic Monitoring Network

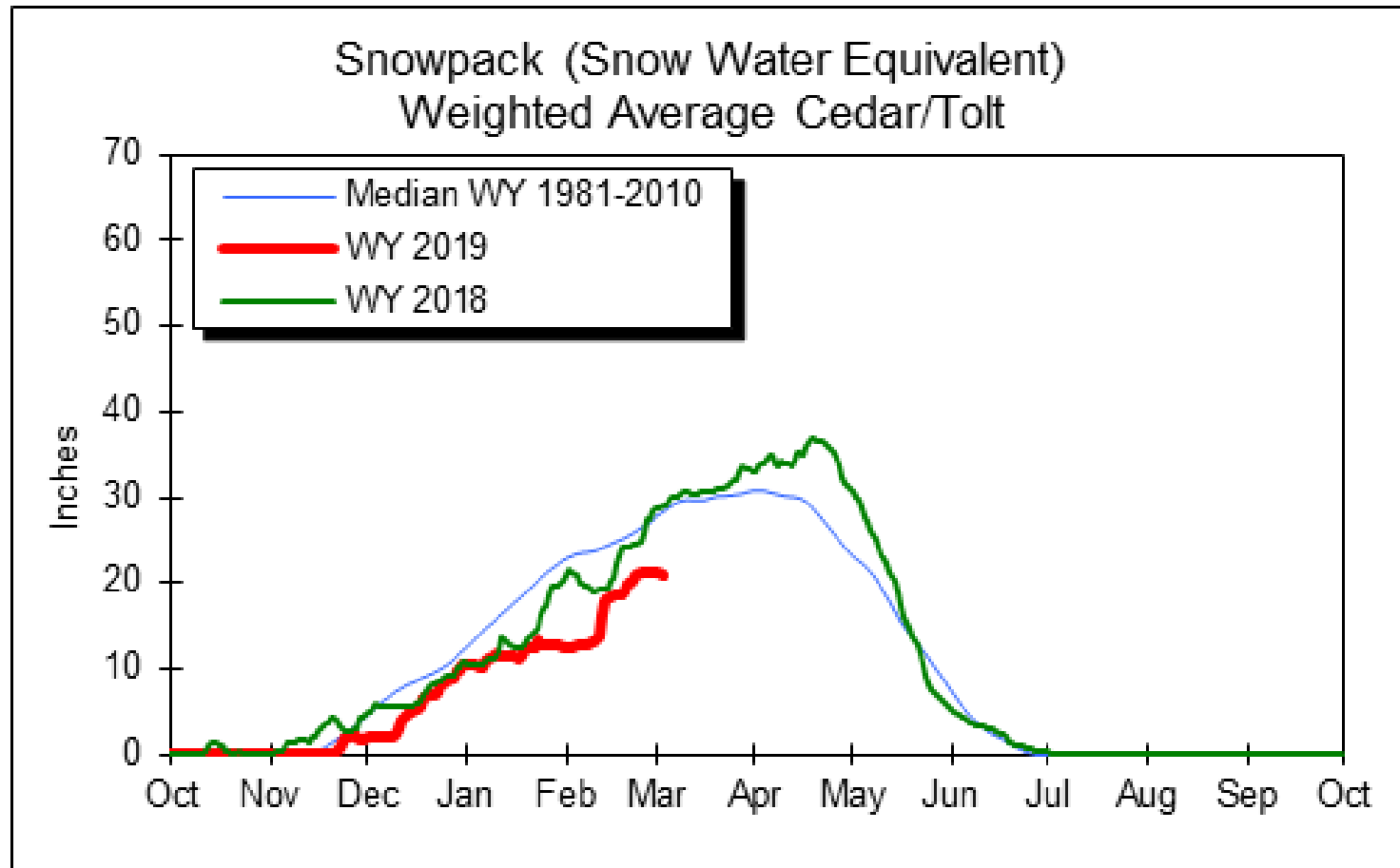


Snotel Stations - Installed 1990s



- Precipitation
- Temperature
- Snow Water Equivalent
- Wind
- Solar Radiation (at some)
- Soil Moisture coming soon...

Snotels used to estimate watershed snow accumulation and melt



Conservative in estimating melt



Photo Credit: SPU Watershed Services
Tinkham SNOTEL Station May 16, 2018

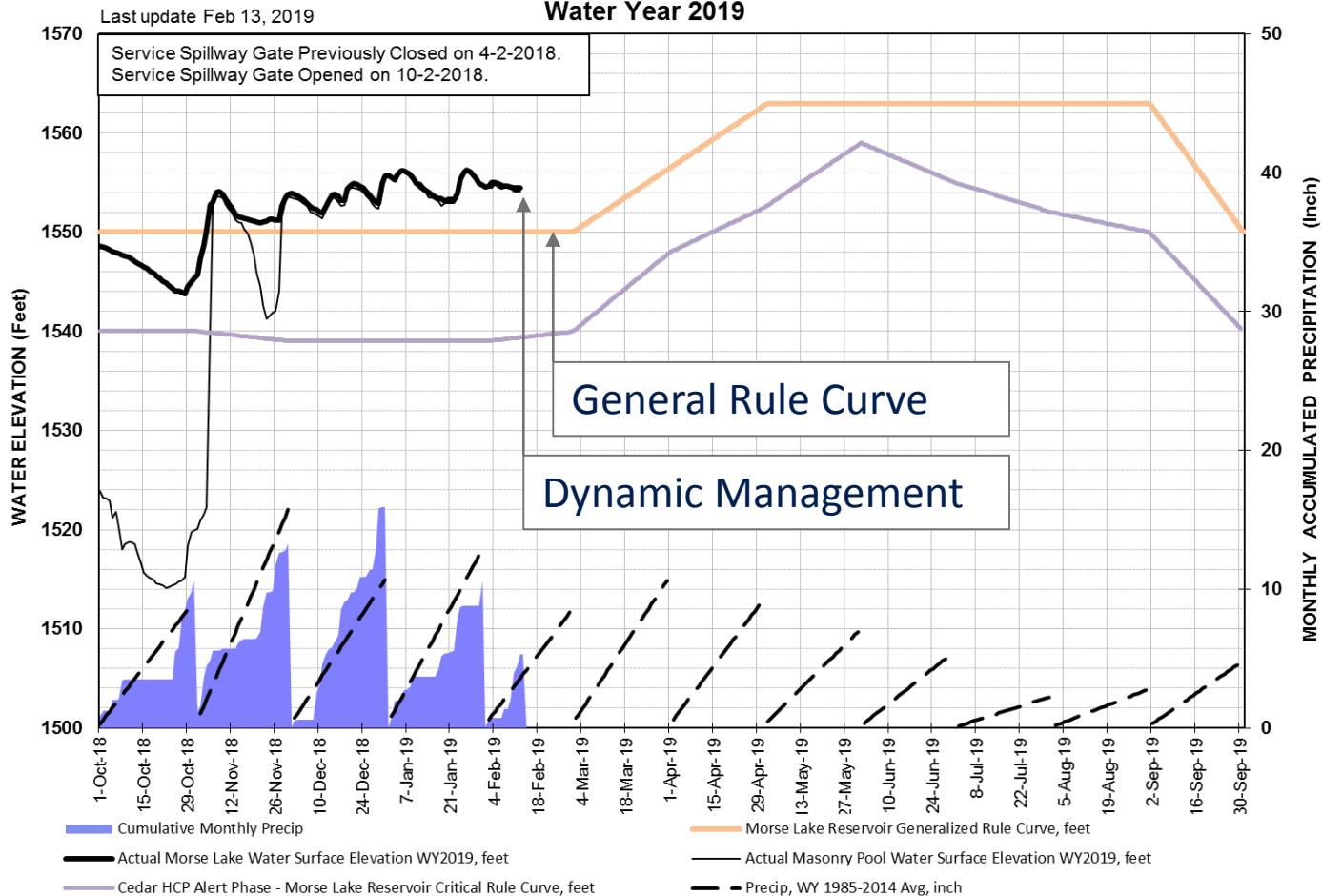
Conservative in estimating melt



Photo Credit: SPU Watershed Services
Tinkham SNOTEL Station May 16, 2018

Target Reservoir Elevations Adjusted Based on Data and Observations

CEDAR RIVER AT RESERVOIR



Summary

- High Quality Drinking Water to Seattle Region
- Meet Multiple Seasonal Objectives
 - Water for People
 - Water for Fish
 - Infrastructure
- Supply Status Update
- Data & Tools for Multiple Planning Horizons